Exhibit 8

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

HEADWATER RESEARCH LLC, Plaintiff, v. SAMSUNG ELECTRONICS CO., LTD. and SAMSUNG ELECTRONICS AMERICA, INC., Defendants.	Case No. 2:22-cv-00422-JRG-RSP **JURY DEMANDED**

Expert Declaration of Douglas A. Chrissan, Ph.D.

TABLE OF CONTENTS

I. INTRODUCTION

1. I have been retained as an expert in the above-captioned case by counsel for Headwater Research LLC ("Headwater"). I understand that the parties dispute the meaning of certain claim terms. I have studied the intrinsic evidence and relevant extrinsic evidence pertaining to those terms. In formulating my opinions, I have relied upon this intrinsic and extrinsic evidence, as well as my experience, education, and knowledge of the relevant art. In this declaration, I provide my opinions regarding how a person of ordinary skill in the relevant art ("POSITA") would understand each claim term at issue, considering the viewpoint of a POSITA at the time of the invention.

2. I am being paid for my work on this matter on an hourly basis at $300/hour. My compensation is not contingent on reaching any particular findings or conclusions, or on any particular outcome in this matter. I have no financial interest in the outcome of this matter.

II. QUALIFICATIONS

3. I am presently a technical consultant in areas that include communications systems, multimedia systems and data processing, and computing devices. A copy of my curriculum vitae is attached as Exhibit A.

4. I earned a B.S. and M.S. in Electrical Engineering from the University of Southern California in 1988 and 1990, respectively, as well as a Ph.D. in Electrical Engineering from Stanford University in 1998.

5. I was a Masters Fellow and Member of the Technical Staff at Hughes Aircraft Company in El Segundo, California, from 1988 to 1993. While at Hughes Aircraft, I designed and developed wireless communication systems for commercial and military spacecraft, including for the MILSTAR satellite program. I also designed and built a state-of-the-art, 800 megabit-per-second (Mbps) telecommunications modem for the NASA Lewis Research Center.

6. From 1993 to 1997, I was a full-time doctoral student at Stanford University. My Ph.D. dissertation and related publications were in the fields of statistical signal processing and

communication systems, and more specifically in the area of impulsive noise modeling for low-frequency communication systems.

7. From 1997 to 2003, I worked at 8x8, Inc., starting as a DSP software engineer in 1997, becoming a manager in 1998, a director in 1999, and Vice President of Engineering in 2000 (managing a team of approximately 60 engineers in the company's microelectronics group). I played a key role in developing several semiconductor products used worldwide in multimedia and communications devices, mainly for video conferencing systems and Internet Protocol ("IP") telephones. Some of these semiconductor products were in production more than ten years.

8. From 2003 to 2007, I was a Systems Architect and Engineering Program Manager at Texas Instruments in the Digital Subscriber Line ("DSL") product business unit. At Texas Instruments, I was directly involved in the architecture, design, development and production of multicarrier DSL modem products. My work specifically included architecting a multicarrier DSL semiconductor and software product and managing all aspects of its development from inception to production. I also gained further experience working with IEEE 802.11 (WLAN/WiFi) and IEEE 802.16 (WiMAX) systems.

9. I have developed, and managed the development of, several successful semiconductor, software and systems products in the communications and multimedia fields. These products are listed in my attached curriculum vitae.

10. Since 2011, I have provided technical consulting services for numerous matters involving intellectual property disputes, including matters involving mobile devices and wireless communication systems. My work in this capacity has included, among other things, reviewing and analyzing source code, reviewing and analyzing patents, preparing expert reports, and providing expert testimony. My attached curriculum vitae provides additional details regarding my experience involving intellectual property disputes.

III. MATERIALS CONSIDERED FOR THIS DECLARATION

11. In forming my opinion, I have reviewed relevant portions of the patent specifications and claims, their prosecution histories, the parties' preliminary claim construction disclosures and extrinsic evidence, and the materials cited in this declaration. I have also relied on my professional experience. I reserve the right to consider additional materials as I become aware of them, and to revise my opinions accordingly.

IV. UNDERSTANDING OF LEGAL PRINCIPLES

12. I understand that a claim construction inquiry begins and ends in all cases with the actual words of the claim. Apart from the written description and the prosecution history, the claims themselves provide substantial guidance as to the meaning of particular terms. I further understand that the context in which a term is used in the asserted claim can be highly instructive. The patent specification can also shed light on the meaning of claim terms.

13. I understand that, when conducting a claim construction inquiry, courts are not required to construe every limitation present in a patent's asserted claims. I further understand that where a term is used in accordance with its plain meaning, the court should not re-characterize it using different language.

14. I understand that there is a "heavy presumption" that claim terms carry their full ordinary and customary meaning unless the accused infringer can show that the patentee expressly relinquished claim scope. The ordinary and customary meaning of a claim term is the meaning that the term would have to a POSITA at the time of the invention.

15. I understand that courts generally do not import limitations into claims from examples or embodiments appearing only in a patent's written description, even when a specification describes very specific embodiments of the invention or even only a single embodiment. Similarly, I understand that statements during patent prosecution do not limit the claims unless the statement is a clear and unambiguous disavowal of claim scope.

16. I understand that Defendants in this action bear the burden of proving that a claim

is indefinite by clear and convincing evidence. I understand that a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention. I understand that when a patent claim uses a subjective term, the court looks to whether the specification provides some objective boundary for those of skill in the art to understand the scope of the invention.

V. BACKGROUND OF THE PATENTED TECHNOLOGIES

17. I understand that there are nine asserted patents in this action, namely U.S. Patent Nos. 9,137,701 (the "'701 patent"); 9,143,976 (the "'976 patent"); 9,271,184 (the "'184 patent"); 9,277,433 (the "'433 patent"); 9,277,445 (the "'445 patent"); 9,521,578 (the "'578 patent"); 9,609,544 (the "'544 patent"); 9,521,578 (the "'578 patent"); 10,237,773 (the "'773 patent"); and 11,405,224 (the "'224 patent"). Samsung's claim construction positions challenge seven of these patents. Specifically, I understand that there is essentially one disputed term that appears in a single dependent claim of each of the '701, '976, '184, '433, '445, '578, and '544 patents.

18. All of the challenged patents include the same relevant disclosures for purposes of the parties' claim construction dispute. The Abstract of the '701 patent explains, for example:

> A wireless end-user device has wireless wide-area network (WWAN) and wireless local-area network (WLAN) modems. One or more processors determine when an application is running in a background state or as a foreground application. The processors control application access for Internet service activities through an application program interface (API). At a time when Internet service activities are communicated through the WWAN modem, the processors use a differential traffic control policy to selectively block and allow network access for an application based on the determination as to whether the application is running in a background state or as a foreground application. A different policy may apply to WLAN modem usage.

'701 patent at Abstract. As discussed further below with reference to exemplary specification teachings, the claimed inventions provide solutions for determining when an application is running in a background state vs. running as a foreground application, and then controlling network access accordingly in order to conserve resources.

VI. LEVEL OF ORDINARY SKILL IN THE ART

19. A POSITA at the time of the invention would have had (1) a bachelor's degree in electrical engineering, computer science, or a comparable field of study, and (2) at least two to three years of professional experience in mobile wireless communications devices or wireless digital communication systems, or other similarly relevant industry experience. Additional relevant industry experience may compensate for lack of formal education or vice versa. I qualified as a POSITA as of the earliest claimed priority date of the asserted patents, in January 2009. I also have an understanding of the capabilities of a POSITA at the relevant time because I taught and worked with such individuals in my professional experience.

20. I understand that Samsung has proposed a different level of ordinary in the art. For example, I understand that Samsung has argued that a POSITA would have had (1) at least a bachelor's degree in computer science, electrical engineering, or a related field, and (2) three to five years of experience with networking, power consumption of networked computing devices, and/or wireless digital communications systems, with additional graduate education substituting for professional experience or vice versa. My opinions herein would not change if the Court were to adopt that definition for the level of ordinary skill.

21. I understand that there may be disputes between the parties as to the specific priority date of each asserted claim, and that Headwater has stated in discovery that if the asserted patents are not entitled to a January 2009 priority claim, they are entitled to a May 2010 priority claim. My opinions herein would not change if the appropriate priority date were determined to be later than January 2009.

VII. DISPUTED TERM

A. "user of the device … perceiving any benefit from that application" ('701 patent, claim 2; '976 patent, claim 2; '184 patent, claim 2; '433 patent, claim

3; '445 patent, claim 2; '578 patent, claim 4; '544 patent, claim 2)

Headwater's Proposal	Samsung's Proposal
Not indefinite; plain and ordinary meaning	**Indefinite**

22. I agree with Headwater's proposal for this claim term, because it has a plain and ordinary meaning that would be reasonably certain to a POSITA and it does not require any further construction. I disagree with Samsung's assertion that the challenged claim language fails to inform a POSITA with reasonable certainty as to the scope of this claim limitation. In my opinion, the challenged claims are not indefinite.

23. I understand that Samsung does not assert that any particular word or phrase within this claim term would not be understandable to a POSITA. Instead, my understanding is that Samsung believes that whether a user is "perceiving any benefit" from an application is a subjective inquiry, and that the specification allegedly provides no objective boundaries to clarify the scope of the claimed invention. I disagree.

24. The surrounding claim language alone provides sufficient clarity to a POSITA as to the scope of the claimed invention. For example, below is a reproduction of independent claim 1 and dependent claim 2 of the '701 patent, the latter of which includes the claim language at issue:

> 1. A wireless end-user device, comprising:
>
> a wireless wide area network (WWAN) modem to communicate data for Internet service activities between the device and at least one WWAN, when configured for and connected to the WWAN;
>
> a wireless local area network (WLAN) modem to communicate data for Internet service activities between the device and at least one WLAN, when configured for and connected to the WLAN;
>
> one or more processors configured to
>
> determine, for a first end-user **application capable of running in a background state and capable of running as a foreground application**, whether the application is running in a background state or as a foreground application, and control, via an application program interface (API), application access for Internet

> service activities provided through the WWAN modem and the WLAN modem, to, based on a first differential traffic control policy, selectively block and allow access by the first end-user application to the WWAN modem at a time when data for Internet service activities is communicated through a WWAN modem connection to the at least one WWAN,
>
> wherein the access is selectively blocked based on a determination that the first end-user application is running in a background state, and wherein the access is selectively allowed based on a determination that the first end-user application is running as a foreground application.
>
> 2. The wireless end-user device of claim 1, wherein the one or more processors are configured to determine that the first end-user **application is running in a background state when a user of the device is not directly interacting with that application or perceiving any benefit from that application**.

25. I note that the '701 patent's claim 2 and the '976 patent's claim 2 recite "when [a/the] user of the device is not directly interacting with that application or perceiving any benefit from that application" (emphasis added). The word "not" is plainly intended to modify both "directly interacting with that application" and "perceiving any benefit from that application." Alternatively, the '184 patent's claim 2 recites "when the user of the device is directly interacting with that application or perceiving any benefit from that application," and similar language is recited in '433 patent, claim 3, '445 patent, claim 2, '578 patent, claim 4 and '544 patent, claim 2. My analysis herein recites the '701 patent, but applies similarly to all of the challenged claims.

26. Claim 1 recites, among other things, that one or more processors are configured to determine whether the recited application "is running in a background state or as a foreground application." '701 patent at cl. 1. Dependent claim 2 further specifies that the application is determined to be running in a background state when either of two conditions is met: (1) when the user is not directly interacting with the application, or (2) when the user is not perceiving any benefit from the application. '701 patent at cl. 2. The other challenged patents include similar, if not identical, claim language in this regard.

27. This surrounding claim language makes clear that the question of whether a user is perceiving a benefit from the application is not a subjective inquiry. The challenged claim

language recites that one or more processors determine whether an application is running in a background state or as a foreground application. This determination considers whether a user is or is not perceiving a benefit from the application, which a POSITA would understand to be indicated by whether the device is or is not performing operations that are noticeable to the user. Any information from an application that is noticeable to a user is expected to be perceived by the user and to be beneficial to the user, or else the application would not waste resources presenting it (i.e., making it noticeable).

28. A user perceives information from a wireless end-user device through his or her senses. For an end-user electronic device like those to which the asserted patents are directed, such senses typically would include sight, hearing, and touch. Thus, "perceiving a benefit" to a POSITA, particularly in the context of the intrinsic record, refers to a benefit that is perceptible to human end-users—as opposed to one that an end user does not know about. This is a sufficiently objective standard with reasonably certain bounds, in the same way and to the same extent that the term "visible" or "audible" would be, for instance.

29. For example, a user can use sight to view information displayed on the device's screen, or can use hearing to receive audio information from the device (e.g., through the device's speakers or headphones connected to the device), or can use touch to receive information such as haptic feedback in response to the user tapping the device's touchscreen. These were all commonly understood ways of receiving information from a wireless end-user device at the time of the claimed inventions. A POSITA would have understood that such information would constitute a benefit to the user, regardless of the user's subjective opinions. For example, a POSITA would not understand the claimed "benefit" to be limited to images that are aesthetically pleasing to the user, music that the user enjoys, etc. Thus, a POSITA would not need to consider the user's subjective opinions in order to ascertain the scope of the claims. My understanding of the claim language is also consistent with numerous extrinsic evidence sources, such as dictionary definitions. *See, e.g.*, HW_00046170 (Webster's II New Riverside Desk Dictionary) at HW_00046172 (defining "perceive" as "[t]o become aware of directly by the

senses, esp. to see or hear"); HW_00046173 (google.com) (defining "perception" as "the ability to see, hear, or become aware of something through the senses"); HW_00046176 (Human Machine Interaction: Research Results of the MMI Program, 2009) (describing virtual reality systems where users perceive "through visual, auditory, and sometimes tactile displays"); HW_00046184 (Oxford English Dictionary) (defining "for the benefit of" as "for the advantage of, on behalf of"); HW_00046187 (Merriam-Webster) (defining "perceive" as "to become aware of through the senses"); HW_00046191 (Dictionary.com) (defining "perceive" as "to become aware of, know, or identify by means of the senses").

30. The "directly interacting" claim language only further demonstrates that the challenged claims are not indefinite, because their scope would be reasonably certain to a POSITA. Again, each challenged claim specifies that an application is determined to be running in a background state when (1) the user is not directly interacting with the application, or (2) the user is not perceiving any benefit from the application. *E.g.*, '701 patent at cl. 2. A POSITA would understand that a user is directly interacting with an application when, for example, he or she is using the device's touchscreen to select a playlist for listening to music. According to the claim language, this would mean that the music application (e.g., Spotify) is running as a foreground application and not in a background state, which a POSITA would readily understand. Similarly, if the user stops directly interacting with the device and leaves it on a table, the user is still perceiving a benefit from the music application if the playlist is still continuing to play music at a later time. In this case, the application would still be considered a foreground application and not in a background state because the user is perceiving a benefit from the application. A POSITA would readily understand this as well.

31. Still other surrounding claim language reinforces this. For example, claim 1 describes selectively allowing access to network resources based on whether the application is in a foreground vs. background state. This is consistent with my understanding of the "directly interacting … or perceiving any benefit" language of the challenged dependent claims because if the user is perceiving a benefit from the application, then it would be reasonable to allow the

application to access network resources so that the application can continue to provide the benefit to the user.

32. The specification similarly demonstrates that a POSITA would readily understand the scope of the challenged claim term. I disagree with Samsung's assertion that "perceiving any benefit" is a purely subjective term that requires objective boundaries in the intrinsic evidence to avoid indefiniteness. Nonetheless, if such objective boundaries were required, the specification provides several. For example, the specification of the '701 patent explains:

> Another example of device service activity behavior that can impact network performance is applications that maintain persistent network communication that generates a relatively high frequency of network data packets. Some applications have persistent signaling that falls into this category. Specific examples include frequent device signaling sequences to update widgets on a desktop; synchronize user data such as calendars, contacts, email, and/or other information/content; check or update email or RSS feeds; access social networking websites or tools; online text, voice or video chat tools; update real-time information; and conduct other repetitive actions. Additional application behavior that can significantly tie up network resources and capacity include, for example, conference meeting services, video streaming, content update, software update, and/or other or similar application behavior. **For example, even when the user is not directly interacting with or benefiting from this type of application, the application can be running in the background and continuing to consume potentially significant network resources**.
>
> For example, the types of service activities and/or device behavior that can reduce network capacity and/or network resource availability include software updates for OS and applications, frequent OS and application background network accesses and signaling, frequent network discovery and/or signaling (e.g., EtherType messages, ARP messages, and/or other messaging related to network access), cloud synchronization services, RSS feeds and/or other background information feeds, application (e.g., web browser) or device behavior reporting, background email downloads, content subscription service updates and downloads (e.g., music/video downloads, news feeds, etc.), text/voice/video chat clients, virus updates, peer to peer networking applications, inefficient network access sequences during frequent power cycling or power save state cycling, large downloads or other high bandwidth accesses, and/or greedy application programs that continually and/or frequently access the network with small transmissions or requests for information. Various other examples will now be apparent to one of ordinary skill in the art.
>
> Thus, not only can network capacity, network performance, and/or network resource availability be degraded by high device transmission bandwidth demand, but other types of persistent or frequent traffic resulting from network resource

> requests, network data accesses or other network interaction can also degrade network capacity, network performance, and/or network resource whether or not the aggregate bandwidth demand as measured by the total data throughput is high or not. Thus, techniques are needed to preserve network capacity by, for example, differentially controlling these types of network service usage activities in various ways depending on the type of service activity requesting network access and/or requesting transactions with network resources.

'701 patent at 8:4-56 (emphasis added). This disclosure also appears in the other challenged patents. Here, the specification provides numerous examples of applications that, if not for the claimed inventions, may otherwise consume significant network resources through frequent downloading and synchronizing of data, even when the user is not directly interacting with the application or benefiting from it. As the specification explains, and as the claims recite, applications can be given access to network resources when they are benefiting the user but denied access when they are not, in order to conserve resources. Continuing with the music application example above, the application may frequently wish to fetch updated software or songs, but allowing the application to do so at any time would not make efficient use of limited resources and could result in various problems described in the specification. The claimed inventions address that problem by determining whether the application should be allowed to access network resources to ensure that resources are not being used wastefully (e.g., not being used by applications that are not providing any benefit to the user when the application seeks access to network resources, such as to download a software update).

33. These examples from the specification provide objective boundaries as to the scope of the challenged claim term. This further demonstrates that the claims are not indefinite. A POSITA would understand from such examples of background activities that the user is not directly interacting with the application or perceiving any benefit from the application when the user-facing features of the app are not in use. The specification provides examples of applications that consume network resources by performing background syncing and updating activities, such as "background email downloads" for an email application. *E.g.*, '701 patent at 8:4-22 (describing applications synchronizing user data such as calendars, contacts, and email as

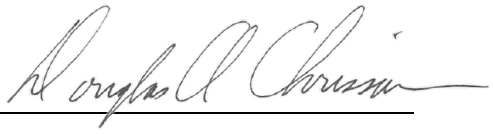
background activities consuming significant network resources even when the user is not directly interacting with or benefiting from the application.) Such automated syncing and updating activities are not user-facing features of the application, and a POSITA would understand from the specification that the claimed system determines that an application performing only such background activities would be in a background state, and not running as a foreground application. Users are generally unaware of such automated syncing and updating processes despite the significant network resources they consume. The claimed inventions address this by blocking network resource access based on determining that the application is running in a background state when the user is not directly interacting with the application or perceiving any benefit from the application, as with syncing or updating processes that are not user-facing features of the application.

34. I also note that the prosecution histories of the challenged patents do not raise any questions about the scope of "perceiving any benefit" or the examples provided in the specification.

35. Thus, it is my opinion that the challenged claim term is not indefinite, and that it does not require construction because its plain meaning is already clear to a POSITA.

I declare under penalty of perjury that the foregoing is true and correct.

Executed November 28, 2023.

By: 

Douglas A. Chrissan

Exhibit A to Chrissan Declaration

Douglas A. Chrissan

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EXPERIENCE:

Extensive communications, multimedia and networking experience with expertise in embedded software, Internet server and client software, mobile device software, wireless and wireline communication technologies, audio/video processing and system-on-chip (SoC) ICs. Fifteen years of management experience.

Engineering and Intellectual Property Consultant 2011–present

Gatekeeper Systems, Inc. 2023–present
Expert Witness and Consultant for Gatekeeper, Inv. No. 337-TA-1357 (USITC). Related Technology: Locking shopping cart wheels.

Dali Wireless, Inc. 2022–present
Expert Witness for Dali Wireless, Inc. (Plaintiff), Case No. 6-22-cv-00104 (W.D. Tex.) and No. 2-22-cv-00012 (E.D. Tex.). Related Technology: cellular systems.

Roku, Inc. 2022–present
Expert Consultant for Roku, IOENGINE LLC v Roku, Inc.
Civil Action No. 6:21-cv-1296-ADA (USDC WDTX). Related Technology: Streaming devices.

Vizio, Inc. 2022–present
Expert Consultant for Vizio, Inv. No. 337-TA-3651 (USITC). Related Technology: Audio and Video processing.

Bright Data Ltd. 2022–present
Expert Consultant for Bright Data Ltd., Case No. 2:22-CV-00011. Related Technology: Internet proxy services.

K.Mizra LLC 2020–present
Expert Witness for K.Mizra (Plaintiff), Case No. 2:21-CV-0241-JRG. Related Technology: cellular location services.

Zircon Corp. 2020–2022
Expert Witness for Zircon (Complainant), ITC Investigation No. 337-TA-1221. Related technology: stud finders.

IPCom, GmbH & Co. KG 2020–2022
Expert Witness for IPCom (Plaintiff), Civil Case Nos. 2:20-cv-321 to -323. Related Technology: cellular systems.

InterDigital, Inc. 2021–2022
Expert Consultant, personal computing devices.

LinkedIn Corp. 2020
Expert Consultant for LinkedIn (Defendant), Civil Case No. 6:20-cv-0545. Related Technology: job search technology

Cellular Evolution LLC 2020
Expert Witness and Consultant for Cellular Evolution LLC (Plaintiff), Civil Case No. 2:19-cv-00228. Related Technology: cellular systems.

Nokia of America Corp. 2019–present
Expert Consultant for Nokia (Defendant), Civil Case No. 2:18-cv-00526-RWS-RSP (Lead case). Related Technology: cellular systems.
Expert Consultant for Nokia (Defendant), Civil Actions No. 14-cv-4666-JRT-TNL, No. 2:21-CV-00063-JRG, No. 6:21-CV-00107-ADA and No. 6:21-CV-00109-ADA. Related Technology: cellular systems.

Sony Interactive Entertainment. 2019–2020
Expert Consultant Sony. Related Technology: gaming.

Silicon Valley X-Ray, Inc. (acquired by Bruker Corp.) 2018–2021
Principal Consultant. Company produces X-Ray based semiconductor test equipment and artificial intelligence computer algorithms to detect defects in electronic devices at micron resolution.

TQ Delta 2016-2017, 2021-2022
Expert Witness for TQ Delta (Plaintiff), Civil Actions 1:15-cv-00611-RGA through 1:15-cv-00616-RGA. Related technology: Multimedia over Coax Alliance (MoCA).

Expert Witness for TQ Delta (Plaintiff), Civil Actions 13-cv-1835-RGA, 13-cv-1836-RGA, 13-cv-2013-RGA, 14-cv-954-RGA, 15-cv-121-RGA and 2:21-cv-310-JRG. Related technology: Digital Subscriber Line.

Expert Witness for TQ Delta (Patent Owner), IPR2016-01006, -01007, -01008, -01009, -01160, -01466, -1469, -1470 and -1760. Related technology: Digital Subscriber Line.

Intellectual Ventures 2013–2022
Expert Witness for IV (Plaintiff), in re Frontier Communications Corp., Case No. 20-22476 (S.D.N.Y Bkrpcy).

Expert Witness for IV (Plaintiff), Civil Cases No. 2:17-cv-00577-JRG, 2:17-cv-661 and 2:17-cv-662. Related technology: LTE.

Expert Witness for IV (Plaintiff), Civil Actions 1:13-cv-00116-LY, 1:13-cv-00118-LY and 1:13-cv-00119-LY. Related technology: Digital Subscriber Line.

Expert Consultant for IV (Plaintiff), Civil Actions 1:12-cv-00193-LPS, 1:13-cv-01668-LPS through 1:13-cv-01672-LPS; 1:13-cv-01668-LPS through 13-cv-01672-LPS and 14-1229-LPS through 14-1233-LPS. Related technology: LTE, 3G WCDMA and other telecommunications.

Monster, Inc. 2014

Expert Consultant for Monster, Inc. (Defendant), Civil Action No. 13 Civ. 8229 (KBF) (S.D.N.Y.) Related Technology: Job search websites.

Wiffledan, Inc. (a.k.a. Vhoto, acquired by Hulu) 2013-2015

Designed and implemented image processing and computer vision algorithms on iOS devices for selecting the most appealing images from a video sequence. These algorithms are used in the *Vhoto* application, available as of 2014 from the Apple App store.

Cavium, Inc. 2011-2012

Managed customer engineering for WiFi-enabled wireless remote display receivers, including the Samsung AllShareCast wireless remote display dongle.

Maxim Integrated Products, Sunnyvale, CA (MXIM)

Engineering Director, Video Processing 2009–2011

Managed and developed the MAX64380 High-Definition H.264 Video Compression/Decompression Integrated Circuit from inception to production.

Managed and developed the MAX64180 High-Definition H.264 Video Compression/Decompression Integrated Circuit from inception to production. This product was used in many internet-connected camera designs for security cameras and TV webcams (cameras connected to Smart TVs).

Managed and developed the iZon camera for Stem, Inc. using the MAX64180. This first-generation, WiFi-connected security camera was available as the Stem iZon product in Apple stores as of 2011.

Managed the development of several Skype TV Webcam designs; these designs enable Smart TVs to run Skype natively as a videoconferencing application on the TV. The first of these designs, for Samsung, was the first Skype TV webcam product in the market (2010).

Keystream Corporation, Mountain View, CA

Vice President, Engineering 2009

Technical Consultant 2007-2008

(Company ceased operations in Dec. 2009)

Managed an agile team of Internet software engineers in the development and release of company's SmartAd platform, an ad delivery system to users' web browsers.

Implemented computer vision algorithms for detecting, tracking and classifying objects in videos.

Texas Instruments, Sunnyvale, CA (TXN)

Program Engineering Manager, DSP Division 2004–2009

Systems Architect, DSL 2003–2004

Managed the development and release to production of the UR8 Digital Subscriber Line (DSL) ADSL2/VDSL2 residential gateway product, including all hardware and software components. This work included substantial contributions to the architecture and design of TI's TNET7531 and TNET7530 multi-core, DSL transceiver integrated circuits and related software. UR8 was a $20M+ product development including 100 engineers at multiple worldwide sites, with first silicon released to production and all software delivered on schedule.

Authored the TI White Paper "Uni-DSL™: One DSL for Universal Service" (see publications section below).

Managed the ~$50M divestiture of TI's digital subscriber line IC products to Infineon, including IT, technology transfer, support, operations and product engineering.

8x8, Inc, Santa Clara, CA (EGHT)

VP Engineering, Netergy Microelectronics group 2000-2003
Director, Signal Processing Algorithms 1999
Manager, Audio Algorithms 1998
Senior Software Engineer 1997

Directed a team of silicon, software, hardware and applications engineers in the development of Voice-over-IP (VoIP) and Video-telephony software and semiconductor products.

Substantially contributed to the development of the Vision Compression Processor EX (VCP-EX) integrated circuit, the Audacity-T2 Voice-Over Internet Protocol Processor integrated circuit and the Audacity-T2U Voice-Over Internet Protocol Processor integrated circuit. The Audacity-T2 and T2U were in production and used in designs worldwide for more than ten years.

Managed major software releases and hardware product lines, enabling company's OEM customers to develop VoIP products including the Ericsson DRG-22 Ethernet Residential Gateway, the Telsey Ethernet Residential Gateway and the D-Link DPH-100 IP Phone.

Architected the design and managed the development of a DSP core for audio/video processing. This DSP core was licensed by ST Microelectronics and led to a $27M investment in the company by ST.

Managed company's IP portfolio of ~50 patents and patent applications.

Designed and managed the implementation of the G.7xx ITU speech compression algorithms on four different DSP architectures

Hughes Aircraft Company

Masters Fellow and Member of Technical Staff 1988-1993

Designed and developed a digitally synthesized, bandwidth efficient 800 Mb/s modem under a NASA Lewis Research Center contract.

Provided pre-sales technical and design support for commercial satellite programs, including the Aussat (Australia) and Palapa (Indonesia) programs.

Designed communication payload circuits for the Milstar satellite program.

EDUCATION:

Ph.D., Electrical Engineering, Stanford University	1998
M.S.E.E., University of Southern California	1990
B.S.E.E., University of Southern California	1988

PUBLICATIONS:

Douglas Chrissan, “Uni-DSL™: One DSL for Universal Service,” Texas Instruments White Paper, SPAY018, June 2004.

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